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动物分类学报

TWO NEW SPECIES OF THE GENUS HESPERENTOMON PRICE, 1960 FROM QINGHAI PROVINCE, NORTHWESTERN CHINA (PROTURA, HESPERENTOMIDAE)

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Abstract Two new species (*Hesperentomon xiningense* sp. nov., *Hesperentomon nanshanensis* sp. nov.) of genus *Hesperentomon* Price, 1960 were described from Qinghai Province, Northwest China. The present two new species are characterized by 8/12 setae on urotergites II- VI and 4/8 setae (lack central posterior seta) on urosternites IV- VI. *Hesperentomon xiningense* sp. nov. is similar to *Hesperentomon nanshanensis* sp. nov., but they can be distinguished by the shape of maxillary gland, female squama genitalis, length of foretarsus, shape of sensilla and the chaetotaxy of abdominal X.

Key words Protura, Hesperentomidae, *Hesperentomon*, new species, Qinghai, China.

1 Introduction

The genus *Hesperentomon*, being established by Price (1960), is characterized by the sausage shaped calyx of maxillay gland and two segmented abdominal legs. Up to now, thirteen species of *Hesperentomon* were reported in the world, ten from China (Yin, 1999; Bu & Yin, 2007) and other three species from USA, Russia and Japan respectively (Price, 1960; Szeptycki, 1988; Imadaté, 1989).

During the soil fauna survey of Northwestern China in 2006 (from May to June), plenty of specimens of *Hesperentomon* were collected from Qinghai Province. Except for *H. chinghaiensis* Yin, 1982 two species were identified and described as new to science. We give our best regards to Professor ZHENG Zhe-Min, an eminent orthopterist of China and the world, for his 55-year teaching anniversary and 75th birthday.

2 Material and Methods

The specimens were collected by using Tullgren funnels. All specimens were mounted on the slide using Hoyer's medium and dried for three days in an oven at 60℃. Type specimens are deposited in Shanghai Entomological Museum (SEM), Institute of Plant Physiology & Ecology, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences.

3 Abbreviations

a: additional seta. a'-c': interior sensilla on foretarsus. *a*-*g*: exterior sensilla on foretarsus. *al*: anterolateral pore. *A*1-*A*5: anterior setae. *Ac*: central anterior seta. BS: ratio of distance between the proximal end and *t*-1/distance between *t*-1 and distal end on foretarsus. CF: ratio of lenth of hind part of maxillary gland/length of head. EU: ratio of length of the empodium/length of the claw. *l*: lateral pore. *ls*: lateral seta. M: middle seta. Mc: central middle seta. *pl*: posterior lateral pore. *pp*: postpseudocular seta. *psm*: posterosubmedial pore. *psl*: posterosublateral pore. *P*1-*P*5: posterior setae. *Pc*: central posterior seta. PR: ratio of length of the head/length of pseudoculus. *sl*: sublateral seta. *sm*: submedial seta. *t*-1-*t*-3: dorsal sensilla on foretarsus. TR: ratio of foretarsal length/length of the claw. α: dorsal setae on foretarsus. β: ventral setae on foretarsus. γ: interior setae on foretarsus. δ: exterior seate on foretarsus.

4 Description

Hesperentomon xiningense **sp. nov.** (Figs. 1-9)

Adult. Body length 1 405-1 498 μm (n= 10).

Head Elliptic, length 125-138 μm, width 88-100 μm. Head setae short, rostrum not protruded. Submedial and sublateral additional setae present. Two additional pairs of pores between pseudocelli absent. (Fig. 1). Pseudoculus pear-like, elongate, with long lever, length 15-18 μm, width 7.5-8.8 μm. PR= 7.3-10 (Fig. 2). Canal of maxillary gland long, with sausage-like calyx and blind end slightly bulked. The posterior dilation is about 2/3-3/4 length of calyx. CF= 3.2-3.7 (Fig. 3). Maxillary palpus with two subequal sensilla, parallel-side (Fig. 4). Labial palpus well developed, with no basal sensillum.

Thorax. Chaetotaxy as shown in Table 1. Mesonotum with two pairs of anterior setae (*A*2 and *A*4), with eight pairs of posterior setae, *P*5*a* and $P5a'$ very short. *P*5*a* on metanotum also very short. Prosternum lacked anterior seta *A*2. Mesonotum and metanotum lacked posterior seta *P*1*a*. Length ratio of *P*1: *P*2 on mesonotum as 1.0: 1.3-1.6. Pronotum with no pores. Mesonotum and metanotum with pores *sl*, *sm* absent. Sternites of thorax with single median pore,

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Table 1. Chaetotaxy of Hesperentomon xiningense **sp. nov.**

	Larva Ⅰ		Larva Ⅱ		Maturus junior		Imago	
	Formula	Composition of setae	Formula	Complementary setae	Formula	Complementary setae	Formula	Complementary setae
Dorsal								
Thorax Ⅰ	4	1, 2	4		4		4	
Ⅱ	$\frac{4}{10}$	A2, M P1, 2, 3, 4, 5a	$\frac{6}{12}$	A4 P5	$\frac{6}{16}$	P2a, 5a′	$\frac{6}{16}$	
Ⅲ	$\frac{4}{10}$	A2, M P1, 2, 3, 4, 5a	$\frac{6}{12}$	A4 P5	$\frac{6}{14}$	P2a	$\frac{6}{14}$	
Abdomen Ⅰ	$\frac{0}{8}$	P1, 2, 3, 4	$\frac{2}{10}$	A1 P5	$\frac{4}{10}$	A2	$\frac{4}{10}$	
Ⅱ- Ⅵ	$\frac{0}{10}$	P1, 2, 3, 4, 5	$\frac{2}{12}$	A1 P4a	$\frac{8}{12}$	A2, 4, 5	$\frac{8}{12}$	
Ⅶ	$\frac{0}{14}$	P1, 1a, 2, 2a, 3, 4, 5	$\frac{6}{16}$	A1, 4, 5 P4a	$\frac{8}{16}$	A2	$\frac{8}{16}$	
Ⅷ	$\frac{0}{14}$	P1, 1a, 2, 2a, 3, 3a, 5	$\frac{4}{14}$	A1, 5	$\frac{6}{14}$	A2	$\frac{6}{14}$	
Ⅸ			8	1, 2, 3, 4	12	2a, 3a	12	
Ⅹ					8	1, 2, 3, 4	10	3a
Ⅺ					8	1, 2, 3, 4	8	
Ⅻ	9		9		9		9	
Ventral								
Thorax Ⅰ	$\frac{2-2}{4}$	A1, M1 P1, 2		$\frac{2-2}{4}$		$\frac{2-2}{6}$	P3	$\frac{2-2}{6}$
Ⅱ	$\frac{4-2}{2}$	A1, 2, M P1	$\frac{4-2}{4}$	P2	$\frac{4-2}{5}$	Pc	$\frac{4-2}{5}$	
Ⅲ	$\frac{4-2}{2}$	A1, 2, M P1	$\frac{6-2}{4}$	A3 P2	$\frac{6-2}{5}$	Pc	$\frac{6-2}{5}$	
Abdomen Ⅰ	$\frac{2}{2}$	A1 P1	$\frac{4}{2}$	A2	$\frac{4}{4}$	P2	$\frac{4}{4}$	
Ⅱ- Ⅲ	$\frac{2}{3}$	A1 Pc, 2	$\frac{2}{3}$		$\frac{4}{5}$	A2 P1	$\frac{4}{5}$	
Ⅳ- Ⅵ	$\frac{2}{4}$	A1 P2, 3	$\frac{2}{6}$	P1	$\frac{4}{8}$	A2 P1a	$\frac{4}{8}$	
Ⅶ	$\frac{2}{4}$	A1 P2, 3	$\frac{2}{7}$	Pc, 1	$\frac{4}{9}$	A2 P1a	$\frac{4}{9}$	
Ⅷ	$\frac{0}{2}$	P1	$\frac{0}{4}$	P2	$\frac{0}{6}$	P1a	$\frac{0}{6}$	
Ⅸ			4	1, 2	6	1a	6	
Ⅹ					4	1, 2	6	1a
Ⅺ					2	1	6	1a, 2
Ⅻ	10		10		10		8	

situated on prosternum posteriorly, on mesosternum and metasternum anteriorly to level of seta M.

Foretarsal length 83-90 μm, claw length 15-20 μm, with no inner flap, TR= 4.7-6; empodium length 3.8-5.0 μm, EU= 0.21-0.29; S-shaped seta shorter than claw. Dorsal sensillum t-1 and t-2 slim and long, BS= 1.1-1.3; t-3 sword-like. Exterior sensillum a, b, c, d, e, f and g all short sword-like and in different length, b and g relatively long. Interior sensillum a', b'-1, b'-2, c'-1 and c'-2 also short sword-like in different length. Length formula of foretarsal sensilla as: $f = c'\text{-}1 < c < b'\text{-}2 = t\text{-}3 < a = e = a' < d < b'\text{-}1 < b = g = c'\text{-}2 < t\text{-}1 = t\text{-}2$ (Figs. 6-7). Middle tarsal length 35-40 μm, claw length 13-15 μm. Hind tarsal length 40-45 μm, claw length 15-18 μm.

Abdomen. Chaetotaxy as shown in Table 1. Urotergite Ⅰ with two pairs of anterior setae ($A1$, $A2$), with five pairs of posterior setae. Urotergites Ⅱ- Ⅵ with four pairs of anterior setae ($A1$, $A2$, $A4$, $A5$), with six pairs of posterior setae, $P1a$ absent. Posterior central seta Pc absent on urosternites Ⅳ- Ⅵ (with 4/8 setae), while present on Ⅶ (with 4/9 setae). Urotergites Ⅰ - Ⅲ with pores psm, psl, al and pl, Urotergites Ⅳ- Ⅶ with pores psm, psl and al. Abdominal legs are typical of the genus, each with two segments and four setae. Urosternites Ⅰ - Ⅶ with one single medial pore.

Striate band on abdominal segment VIII reduced, the hind margine with sparse granules (Fig. 9). Urosternite VIII with setae 0/6. Urotergite VIII with pores *psm* and *pl*, sternite with one posterior medial pore. Comb on abdomen VIII rectangular, with 8-10 teeth on hind margin (Fig. 5). Abdominal segment X with five pairs of setae (1, 2, 3, 3a, 4) on tergite and with 3 pairs of setae (1, 1a, 2) on sternite. Base of some setae on segments X-XII surrounded with very small ciliae, similar to that of *H. martynovae* Szeptycki, 1988. Urotergite IX, X and XII with single median pore and XI with no pores. Urosternite IX with single median pore, X-XI with no pores, XII with 1+1 pores on its anterolateral part.

Female squama genitalis relatively strong. Acrostyli long subuliform, with one short flap at its outer side (Fig. 8).

Younger instars. The measurements and indexes of younger instars as show in the Table 2. Maturus junior and larva II lack sensillum b'-1 on foretarsus. Larva I lack sensilla b'-1 and c'-1.

Holotype ♀ (mounted) (No. Q0612), from coniferous forest of Nanshan Park (36°36′N, 101°46′E, alt. 2 419 m), Xining, Qinghai Province, China, 26 May 2006, collected by Dr. LUAN Yun-Xia, GAO Yan and BU Yun. Paratypes: 1 ♀ (No. Q0650), 4 ♂♂ (Nos. Q0614, Q0615, Q0646, Q0647) (mounted), same data as for holotype.

Other specimens examined. 2 ♀♀ (Nos. Q0605, Q0606) from latifoliate forest (36°40′N, 101°22′E, alt. 2 500 m), Huangyuan, Xining, Qinghai Province, China 2 ♂♂ (Nos. Q0648, Q0649), 1 maturus juniors (No. Q0639), 3 larvae II (Nos. Q0640, Q0644, Q0660), 1 larvae I (No. Q0645), same data as for holotype.

Table 2. Body measurements (in μm) and indexes of the younger instars of Hesperentomon xiningense **sp. nov.**

	Maturus junior	Larva II	Larva I
Body length	1 278	868-933	710
Head length	112.5	93-95	87.5
Pseudoculus	15	10-13	12.5
PR	7.5	6.3	7
CF	3	3.4-3.5	3.9
Mesonotal *P*1	12.5	10	7.5
Mesonotal *P*2	17.5	12.5	10
Foretarsus	80	50-53	40
BS	1	0.75-1.1	0.78
Claw	12.5	7.5-10	10
TR	6.4	5.3-7	4
Empodium	3.8	2.5-3.8	3.8
EU	0.3	0.29-0.38	0.38
Middle tarsus	37.5	23-25	17.5
Hind tarsus	40	25-28	20
No of specimens examined	1	3	1

Etymology. The species name derived from Xining City where the species were collected.

Distribution. Qinghai Province, Northwest China.

Diagnosis. *Hesperentomon xiningense* sp. nov. is characterized by 8/12 setae on urotergites II-VI and 4/8 setae (lack seta *Pc*) on urosternites IV-VI. It can be distinguished from *H. tianshanicum* Martynova, 1970 by the chaetotaxy of thorax and urotergite VII, from *H. monluniaum* Yin, 1984 by the shape of maxillary gland and claw, also by the chaetotaxy of prosternum, mesonotum, metanotum and abdominal IX-X, from *H. huashanensis* Yin, 1982 and *H. sichuanensis* Tang *et* Yin, 1988 by the shape of pseudoculus and the length of posterior dilation of maxillary gland.

Lacking of seta *Pc* on one or two segments among urotergites IV-VI were also observed in some specimens of *H. pectigastrulum* Yin, 1984, but *Pc* really present in its larve II. So this phenomenon can be regarded as chaetal variation in *pectigastrulum*. However, the larva II, maturus juniors and adults of present new species all without seta *Pc* on urosternites IV-VI. In addition, chaetotaxy of sternites of thorax, length of foretarsus, shape and length of sensilla, TR, BS of new species are also different to that of *pectigastrulum*.

Hesperentomon nanshanensis **sp. nov.** (Figs. 10-19)

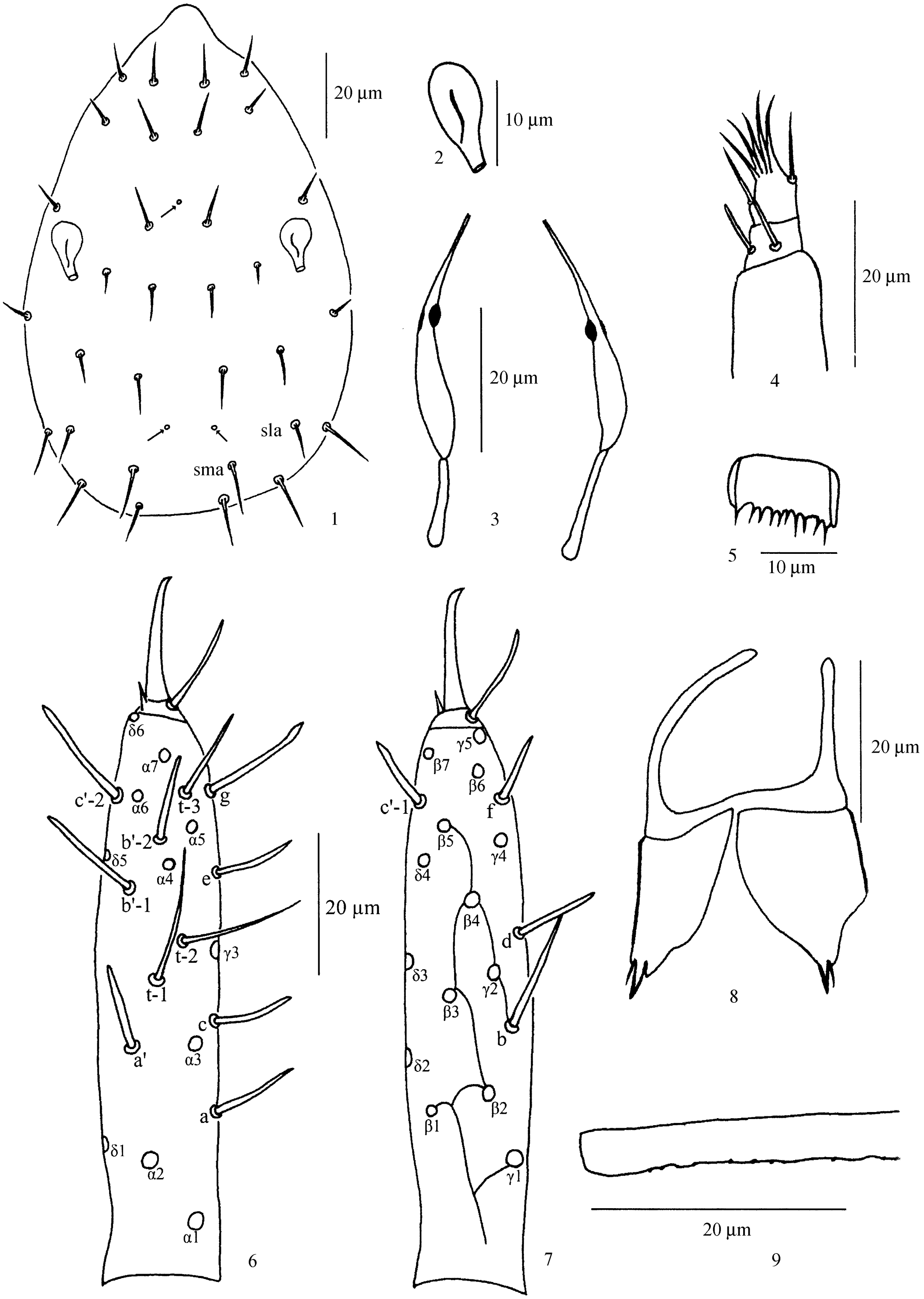
Adult. Body length 1 090-1 235 μm ($n = 9$).

Head. Elliptic, length 125-138 μm, width 73-80 μm. Head setae short, rostrum not protruded. Submedial and sublateral additional setae present. Two additional pairs of pores between pseudocelli absent. (Fig. 10). Pseudoculus pear-like, elongate, with long lever, length 13-15 μm, width 7.5 μm. PR = 7.2-9.0 (Fig. 11). Canal of maxillary gland long, with sausage-like calyx. The posterior dilation is about 1/2 length of calyx. CF = 3.4-3.9 (Fig. 12). Maxillary palpus with two subequal sensilla, parallel-side (Fig. 13). Labial palpus well developed, with no basal sensillum.

Thorax. Chaetotaxy as shown in Table 3. Mesonotum with two pairs of anterior setae (*A*2 and *A*4), with eight pairs of posterior setae, *P*5*a* and *P*5*a*′ very short. *P*5*a* on metanotum also very short. Prosternum lacked anterior setae *A*2. Mesonotum and metanotum lacked posterior seta *P*1*a*. Length ratio of *P*1 : *P*2 on mesonotum as 1.00∶1.25. Pronotum with no pores. Mesonotum and metanotum with pores *sl*, *sm* absent. Sternites of thorax with single median pore, situated on prosternum posteriorly, on mesosternum and metasternum anteriorly to level of seta *M*.

Foretarsal length 58-68 μm, claw length 15-20 μm, with no inner flap, TR = 5-6.3; Empodium length 3.8 μm, EU = 0.25-0.38; S-shaped seta shorter than claw. Dorsal sensillum *t*-1 and *t*-2 slim and long, BS = 1.1-1.2; *t*-3 sword-like. Exterior sensillum *a*, *b*, *c*, *d*, *e*, *f* and *g* all short sword-like and in different length, *b* and *g* relatively long. Interior sensillum a', b'-1, b'-2,

c'-1 and c'-2 also short sword-like in different length. Length formula of foretarsal sensilla as: $f = c'\text{-}1 < a' = b'\text{-}2 < a = b = c < e = t\text{-}3 < g = b'\text{-}1 = c'\text{-}2 < d < t\text{-}1 < t\text{-}2$ (Figs. 15-16). Middle tarsal length 25-28 μm, claw length 10 μm. Hind tarsal length 28-33 μm, claw length 10-13 μm.



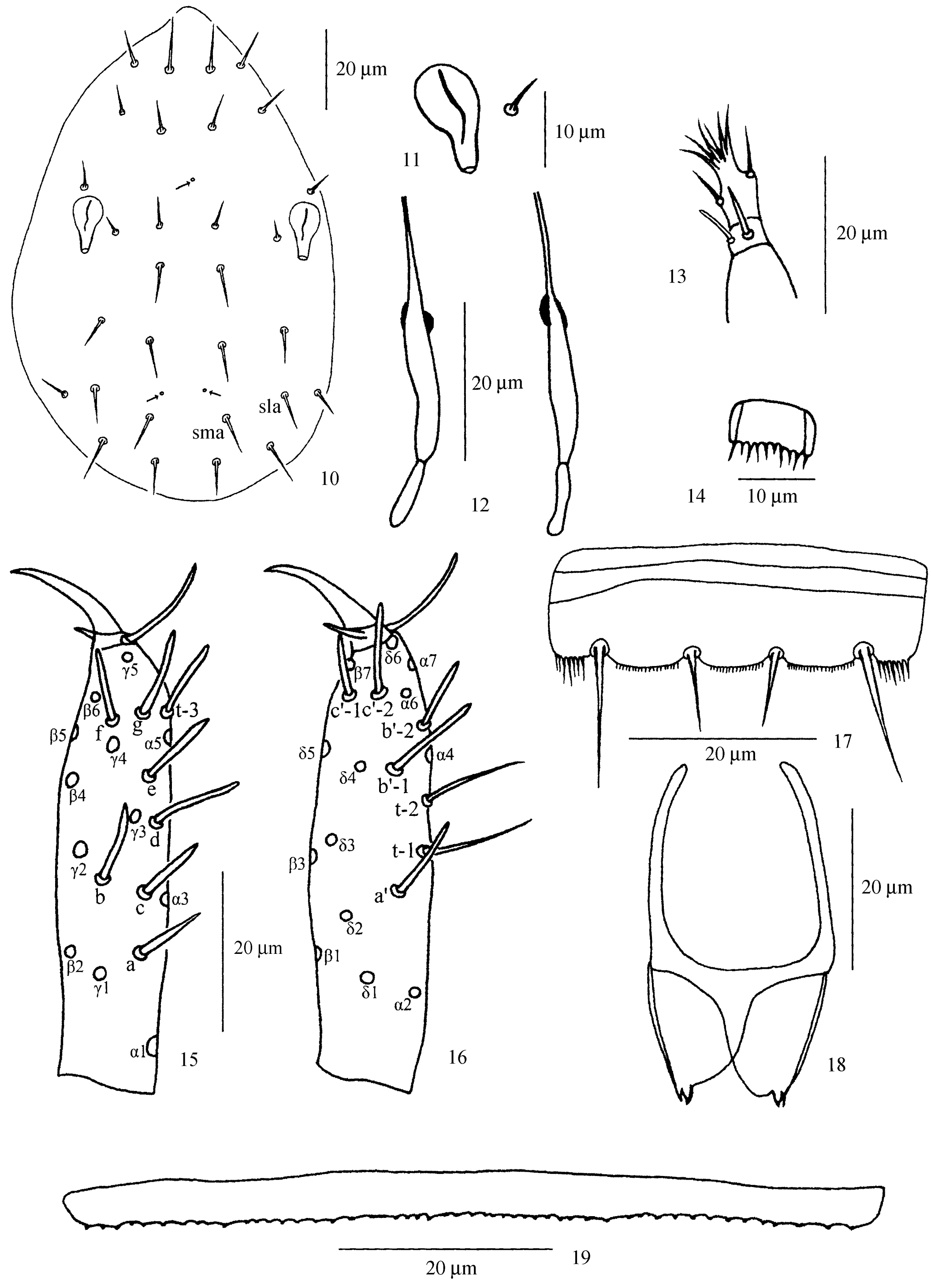
Figs 1-9. *Hesperentomon xiningense* sp. nov. 1. Head, dorsal view (arrows-pores). 2. Pseudoculus. 3. Canal of maxillary gland. 4. Maxillary palpus. 5. Comb on abdominal Ⅷ. 6. Foretarsus, exterior view. 7. Foretarsus, interior view. 8. Female squama genitali. 9. Striate band on abdominal Ⅷ.

Abdomen. Chaetotaxy as shown in Table 3. Urotergite Ⅰ with two pairs of anterior setae ($A1$, $A2$), with five pairs of posterior setae. Urotergites Ⅱ-Ⅵ with four pairs of anterior setae ($A1$, $A2$, $A4$, $A5$), with six pairs of posterior setae, $P1a$ absent. Posterior central seta Pc absent on urosternites Ⅳ-Ⅵ (with 4/8 setae), while present on VII (with 4/9 setae). Urotergites I - III with pores *psm*, *psl*, *al* and *pl*, urotergites IV- VII with pores psm, *psl* and *al*. Abdominal legs are typical of the genus, each with two segments and four setae. Urosternites I - VII with one single medial pore.

Striate band on abdominal segment VIII reduced, hind margine with regular granules (Fig. 19). Urosternite VIII with setae 0/6. Urotergite VIII with pores *psm* and *pl*, sternite with one posterior medial pore. Comb on abdomen VIII rectangular, with 7- 10 teeth on hind margin (Fig. 14). Abdominal segment X with four pairs of setae (1, 2, 3, 4) on tergite and with 2 pairs of setae (1, 2) on sternite (Fig. 17). The hind margine of segment X- XI with little denticles. The denticles on the lateral side of urosternite X extremely long, teeth-like, far longer than that of *pectigastrulum* (Fig. 17). Base of some setae on segments X- XII surrounded with very small ciliae, similar to that of *Hesperentomon xiningense* sp. nov. Some lines on segment X- XII also with granules. Urotergite IX, X and XII with single median pore and XI with no pores. Urosternite IX with single median pore, X- XI with no pores, XII with 1 + 1 pores on its anterolateral part.

Table 3. Chaetotaxy of Hesperentomon nanshanensis **sp. nov.**

	Larva II		Maturus junior		Imago	
	Formula	Composition of setae	Formula	Complementary setae	Formula	Complementary setae
Dorsal						
Thorax I	4	1, 2	4		4	
II	6/12	A2, 4, M P1, 2, 3, 4, 5, 5a	6/16	P2a, 5a′	6/16	
III	6/12	A2, 4, M P1, 2, 3, 4, 5, 5a	6/14	P2a	6/14	
Abdomen I	2/10	A1 P1, 2, 3, 4, 5	4/10	A2	4/10	
II- VI	2/12	A1 P1, 2, 3, 4, 4a, 5	8/12	A2, 4, 5	8/12	
VII	4 (6)/16	A1, (4), 5 P1, 1a, 2, 2a, 3, 4, 4a, 5	8/16	A2, (4)	8/16	
VIII	4/14	A1, 5 P1, 1a, 2, 2a, 3, 3a, 5	6/14	A2	6/14	
IX	8	1, 2, 3, 4	12	2a, 3a	12	
X			8	1, 2, 3, 4	8	
XI			8	1, 2, 3, 4	8	
XII	9		9		9	
Ventral						
Thorax I	2- 2/4	A1, M P1, 2	2- 2/6	P3	2- 2/6	
II	4- 2/4	A1, 2, M P1, 2	4- 2/5	Pc	4- 2/5	
III	6- 2/4	A1, 2, 3, M P1, 2	6- 2/5	Pc	6- 2/5	
Abdomen I	4/2	A1, 2 P1	4/4	P2	4/4	
II	2/3	A1 Pc, 2	4/5	A2 P1	4/5	
III	2/4	A1 P1, 2	4/5	A2 Pc	4/5	
IV- VII	2/6	A1 P1, 2, 3	4/8	A2 P1a	4/8	
VII	2/7	A1 Pc, 1, 2, 3	4/9	A2 P1a	4/9	
VIII	0/4	P1, 2	0/6	P1a	0/6	
IX	4	1, 2	6	1a	6	
X			4	1, 2	4	
XI			2	1	6	1a, 2
XII	10		10		8	



Figs 10-19. *Hesperentomon nanshanensis* sp. nov. 10. Head, dorsal view (arrows – pores). 11. Pseudoculus. 12. Canal of maxillary gland. 13. Maxillary palpus. 14. Comb on abdominal Ⅷ. 15. Foretarsus, exterior view. 16. Foretarsus, interior view. 17. Urosternite X. 18. Female squama genitalis. 19. Striate band on abdominal Ⅷ.

Female squama genitalis robust. Acrostyli short, subuliform, with one little flap at its outer side (Fig. 18).

Younger instars. The measurements and indexes of younger instars as show in the Table 4. Maturus junior and larva Ⅱ lack sensillum b'-1 on foretarsus.

Holotype ♀ (mounted) (No. Q0652), from coniferous forest of Nanshan Park (36°36′N, 101°46′E, alt. 2 419 m), Xining, Qinghai Province, China, 26 May 2006, collected by Dr. LUAN Yun-Xia, GAO Yan and BU Yun. Paratypes: 4 ♀♀ (Nos. Q0613, Q0651, Q0653, Q0654) (mounted), same data as for holotype. Other specimens examined 4 ♀♀ (Nos. Q0655-Q0658), 5 maturus juniors (Nos. Q0616, Q0637, Q0638, Q0641, Q0659), 2 larvae Ⅱ (Nos. Q0642,

Table 4. Body measurements (in μm) and indexes of the younger instars of Hesperentomon nanshanensis **sp. nov.**

	Maturus junior	Larva II
Body length	975-1 055	895-908
Head length	98-112	95
Pseudoculus	13-14	13
PR	7.6-8.6	7.5-7.6
CF	3.5-4.3	3.5-3.8
Mesonotal *P*1	10	9
Mesonotal *P*2	12.5	12
Foretarsus	55-58	50
BS	0.92-1.10	0.82
Claw	8.0-12.5	7.5
TR	5.5-7.3	5.7-6.7
Empodium	2.5-3.8	2.5
EU	0.30-0.38	0.29-0.33
Middle tarsus	23-25	23
Hind tarsus	25-28	25
No of specimens examined	5	2

Q0643) same data as for holotype.

Etymology. The species name derived from Nanshan Park where the species were collected.

Distribution. Qinghai Province, Northwest China.

Diagnosis. *Hesperentomon nanshanensis* sp. nov. with short posterior dilation of maxillary gland (about 1/2 length of calyx), which is similar to that of *H. huashanensis* Yin, 1982 and *H. sichuanensis* Tang *et* Yin, 1988. It differs from these two species in the shape of pseudoculus and the chaetotaxy of urosternite Ⅳ-Ⅵ. By comparison, the chaetotaxy of *Hesperentomon nanshanensis* sp. nov. is similar to *Hesperentomon xiningense* sp. nov., but they can be distinguished by the shape of maxillary gland, female squama genitalis, length and sensilla of foretarsus and the chaetotaxy of abdominal Ⅹ, *etc*. (Table 5).

Table 5. Differences between H. nanshanensis **sp. nov. and** H. xiningense **sp. nov.**

	H. nanshanensis sp. nov.	*H. xiningense* sp. nov.
Body length (μm)	1 090-1 235	1 405-1 498
Foretarsus length (μm)	58-68	83-90
Sensillum *b* on foretarsus	As long as *a* and *c*	Far longer than a and c
Maxillary gland	Posterior dilation about 1/2 length of calyx	Posterior dilation about 2/3-3/4 length of calyx
Hind margine of striate band	With regular granules	With sparse granules
Acrostyli of female squama genitalis	Short	Long
Urotergite X	With 4 pairs of setae	With 5 pairs of setae
Urostemite X	With 2 pairs of setae, 1*a* absent	With 3 pairs of setae, 1*a* present

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中国青海省夕 属二新种记述（原尾纲，夕 科）*

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摘 要 记述了采自青海省的夕 属2新种，即西宁夕 *Hesperentomon xiningense* sp. nov. 和南山夕 *Hesperentomon nanshanensis* sp. nov.，两新种腹部第Ⅱ~Ⅵ节背板后排具有6对刚毛，毛序为8/12，第Ⅳ~Ⅵ节腹板缺失后排中刚毛*Pc*，毛序为4/8。西宁夕 和南山夕 相似，二者可以通过颚腺、雌性外生殖器、前足跗节的长度、感器形状以及腹部第Ⅹ节的毛序加以区分。新种模式标本保存在上海昆虫博物馆。

关键词 原尾纲，夕 科，夕 属，新种，青海，中国.
中图分类号 Q969.11

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